

### **REMARKS**

In the Office Action, claims 1-23 were rejected. By the present Response, claims 1 and 17 are amended. Upon entry of the amendments, claims 1-26 will remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested.

### **Rejections Under 35 U.S.C. § 112**

The Examiner rejected claims 25 and 26 under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. Applicants respectfully traverse the rejection.

Claim 25 recites the limitations that the hot gas path surface comprises wheelspaces, angelwings, a rotor surface, combustor liners and the component comprises a steam turbine, a compressor, or a heat exchanger. The support for these limitations can be found at paragraph [0027] of the application. That text is set forth below:

“Exemplary film cooled components include hot gas path components in turbines for example stationary vanes (nozzles), *turbine blade (rotors)*, *combustion liners*, other combustion system components, transition pieces, and shrouds.”

As can be seen, the exemplary hot gas path components include components such as rotors and combustion liners. Applicants respectfully submit that one skilled in the art at the time the invention was made would recognize that the present invention is applicable to other hot gas path surfaces such as wheelspaces and angel wings and other similar components such as a steam turbine, compressor and heat exchanger. Therefore, Applicants request the Examiner to remove this rejection.

Claim 26 recites that the flow director comprises an airfoil trailing edge bleed slot flow director configured to direct the coolant towards the hot surface. The support for

this limitation can be found at paragraph [0030] of the application. That text is set forth below;

“For heavily cooled parts, for example *airfoils* positioned immediately after the combustion section, which see the hottest gases, on the order of 700 film-cooling holes 14 may be formed in the wall 12 of the airfoil 10.”

Applicants respectfully submit that the flow director may be thus used to direct the coolant towards the hot surface of the airfoil such as for a airfoil trailing edge bleed slot. Therefore, Applicants request the Examiner to remove this rejection.

#### **Rejections Under 35 U.S.C. § 102**

The Office Action summarizes claims 1-5, 10-20 and 23 as rejected under 35 U.S.C. §102(b) as being anticipated by Bunker et al. (U.S. Patent No. 6,234,755; hereinafter “Bunker”). Rejected claims 1 and 17 are independent claims and will be discussed in detail below.

By the present response independent claims 1 and 17 are amended. Independent claims 1 and 17 and the claims depending therefrom are believed to be patentable for the reasons summarized below.

#### **Claims 1 and 17**

Amended claim 1 recites a method for forming a flow director on a component comprising a wall, said method comprising depositing at least one layer on the wall of the component, wherein said deposition includes shaping the at least one layer in accordance with a predetermined shape to form the flow director that extends radially outwards from the wall of the component and into a hot gas flow path to direct a coolant flowing from a film-cooling hole toward a hot surface of the wall.

Amended claim 17 recites a method for forming a flow director on a turbine component comprising a wall having a cold surface and a hot surface, wherein at least one film-cooling hole extends through the wall for flowing a coolant from the cold surface to the hot surface, the film-cooling hole defining an exit site in the hot surface of the wall. The method includes depositing at least one layer on the wall of the component, wherein said deposition includes shaping the at least one layer in accordance with a predetermined shape to form the flow director that extends radially outwards from the wall of the component and into a hot gas flow path to direct the coolant flowing from the film-cooling hole toward the hot surface of the wall.

Applicants thus submit that independent claims 1, and 17 recite, in generally similar language, forming the flow director that extends radially outwards from the wall of the component and into a hot gas flow path to direct the coolant flowing from the film-cooling hole toward the hot surface of the wall. *See* Application, paragraphs [0027], [0029]; Fig. 3.

The Examiner argued that Bunker discloses a method of forming a flow director (by forming a slot over the holes) on a component comprising a wall by depositing at least one layer on the wall of the component, wherein said deposition includes shaping the layers in accordance with the predetermined shape of the flow director. The Examiner cited passages at col. 2, lines 20-24 and lines 50-60 in support of the rejection.

Further, the Examiner notes that the slot is formed by applying a film over the surface (wall) of the component and that in this manner the slot extends inwards from the surface of the coating (73) but extends outwards from the wall of the component (62) that existed before the coating was applied.

Applicants respectfully submit that the flow director (slot) of Bunker does not extend radially outwards from the wall of the component through the hot gas flow path. The present invention teaches a flow director that extends radially outwards from the wall of the component and through the hot gas flow path, to direct a coolant flowing from a film-cooling hole toward a hot surface of the wall. Exemplary flow directors include connectors, flow modifiers and ridges. *See* Application, paragraphs [0045]. At least one film-cooling hole extends through the wall for flowing a coolant from a cold surface to the hot surface of the wall through an exit site. The flow modifier is adapted to direct the coolant flowing from the film-cooling hole and out of the exit site toward the hot surface of the wall thereby enhancing the film cooling provided by the film-cooling hole. Thus, the component may be maintained at a lower temperature relative to a conventional film-cooled hot gas path component, for a given coolant throughput. Furthermore, the amount of coolant used can be reduced, while achieving the same amount of film cooling for the component relative to a conventional film-cooled component.

Bunker does not teach such an arrangement. The passages relied upon by the Examiner have been carefully reviewed and it is respectfully submitted that the passages do not relate to forming a flow director that extends radially outwards from the wall of the component and into the hot gas flow path. Rather, Bunker discloses a method for improving the cooling effectiveness of a fluid, which flows through a row of passage holes in a substrate out to a high temperature surface of the substrate. The method involves forming a slot over the holes, within the high temperature surface of the substrate. *See*, Bunker, Abstract. The slot of Bunker serves as a spillway trench for the coolant air exiting cooling holes. Further, the slot is located entirely within a coating deposited on the substrate, with the substrate's hot surface serving as the slot bottom. Clearly, Bunker does not teach the flow director extending radially outwards from the surface and into the hot gas flow path.

Applicants respectfully submit that a *prima facie* case of anticipation cannot be supported by Bunker against claims 1 and 17. Therefore, it is submitted that independent claims 1 and 17 and their dependent claims are allowable and respectfully request the Examiner to reconsider rejection of the claim.

**Rejections Under 35 U.S.C. § 103**

The Office Action summarizes claims 6-9, 21 and 22 as rejected under 35 U.S.C. §103(a) as being unpatentable over Bunker in view of Sabol et al. (U.S. Patent No. 6,060,174).

Claims 6-9, 21 and 22 depend from independent claims 1 and 17, respectively. Applicants respectfully submit that inasmuch as independent claims 1 and 17 are allowable, these claims are allowable at least by virtue of their dependence from an allowable base claim.

**Conclusion**

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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//Patrick K. Patnode//  
Patrick K. Patnode  
Reg. No. 40,121  
General Electric Company  
Building K1, Room 3A59  
Schenectady, New York 12301  
Telephone: (518) 387-5286